

EDAPHIC CHARACTERISTICS OF GRASSLANDS IN THE KNUCKLES CONSERVATION ZONE

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Grasslands in the Knuckles Region cover 7.5% of the total land area of the conservation zone and consist of both natural and man-made patanas. Of these, man-made patana grasslands are attributable to the intensive cultivation of coffee, tea and other permanent crops in early periods. These grasslands however support rare endemic species which are under the threat of anthropogenic activities. Available information on edaphic characteristics of grasslands of the Knuckles Region is very fragmentary and hardly useful in conservation practices. Especially, the patterns of spatial heterogeneity of grassland soils have not yet been revealed. The objectives of this study were to identify the edaphic characteristics of the Knuckles grasslands, the patterns of spatial variations and to reveal the factors affecting the spatial variations.

Grassland sites at Kelebokke, Loolwatte, Thangappuwa, Riverstone, and Pitawala patana of the Knuckles region were selected for the study. Fifty six random points were selected and marked on a 1:50,000ha map. These points were identified using a GPS receiver and soil samples (5 – 10cm) were taken from each selected point. Soil colour, total organic carbon, total nitrogen, and exchangeable cations (total phosphorus, sodium, potassium, calcium, and magnesium) were detected using standard techniques.

Detrended Correspondence Analysis (DCA) revealed that the soil is highly heterogeneous. A higher overall spatial heterogeneity has been maintained mainly by nitrogen contents (coefficient of variance =1.1621) as by nature nitrogen is a highly mobile element. Frequently burnt plots at Kelebokke showed increased potassium, calcium and magnesium levels and a higher carbon/nitrogen ratio which is only a temporary effect of accumulated ash. Thangappuwa and Loolwatte patanas, which have been intensely disturbed due to tea plantations in the past, are poor in potassium and magnesium and have low carbon:nitrogen ratios. This may be due to improper agricultural practices that have been prevailing in the area over a long period resulting in permanent soil degradation. Since soil disturbance stimulate mineralization, these cations are readily susceptible for leaching and are also taken up by plants after repeated cropping. Pitawala patana, being a natural patana, is deficient in soil potassium due to intensive grazing but deficient in calcium and magnesium. The latter may be due to the more organic nature of the soil or due to some natural ecological reasons prevailing in a shallower soil on a rocky expanse.

The study reveals that unplanned anthropogenic activities and overgrazing of patana grasslands result in permanent soil degradation and affect the edaphic characteristics. These may have impacts on the vegetation as well. Therefore, it is timely important to control unplanned human activities for the conservation of soil and the vegetation of the area.

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